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(54) **Tractor implement hitches**

(57) A tractor hitch (10) comprises a pair of lower links (12) pivoted on a chassis (11) of a tractor. Each lower link (12) has lift rod (15) connected with a hitch actuator (17a) which is used to raise the lower links (12)

relative to the chassis (11). Each lift rod (15) is provided with a means (18,20) for shortening its effective length in a stepwise manner so that the lower links (12) can be raised to a higher position relative to the tractor chassis (11) when the hitch actuator (17a) is used.

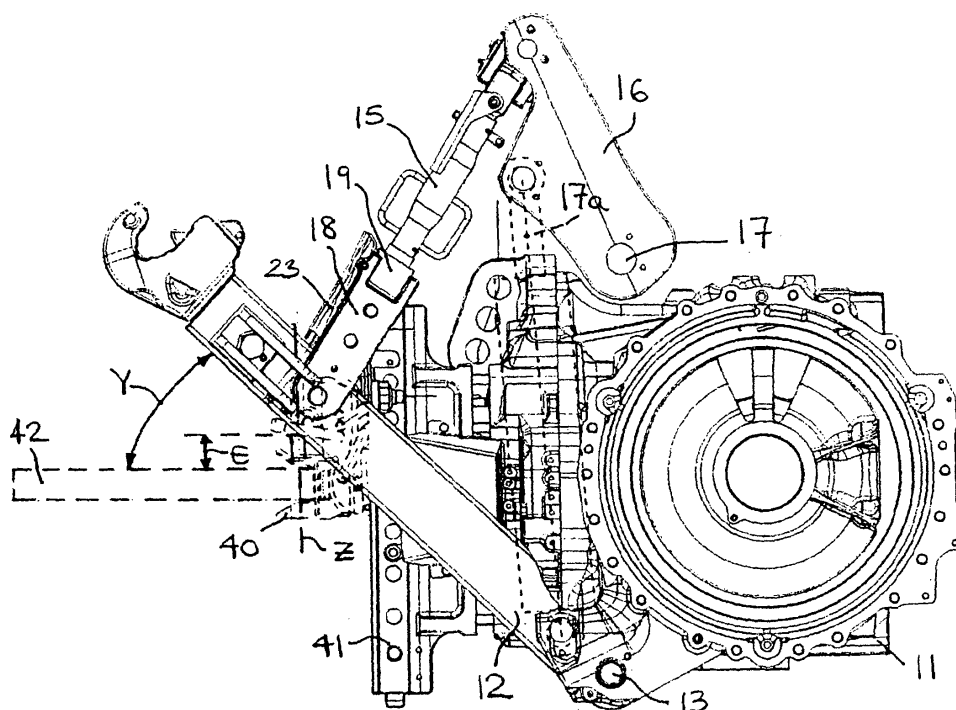


FIG. 2.

Description

[0001] This invention relates to tractors having implement hitches in which a pair of lower links are pivotally mounted on a tractor chassis and each link has a lifting rod connected with a hitch actuator which is used to pivot the lower link relative to the tractor chassis and hence raise and lower any implement connected with the lower links.

[0002] Such hitches are standard at the rear of agricultural and industrial tractors and it is well known to have a towing hitch mounted on the rear of such a tractor at a location between the lower links for the attachment of a trailer or implement via a drawbar. Problems can arise with such installations as the lower links can impede the ability of any drawbar mounted on the towing hitch to pivot relative to the rear of the tractor thus restricting the turning capability of the tractor and trailer.

[0003] It is an object of the present invention to provide a tractor with an implement hitch which at least mitigates the above problem by enabling the tractor operator to increase the height of which the lower links can be raised to clear the drawbar.

[0004] Thus in accordance with the present invention there is provided a tractor having a chassis with an implement hitch comprising a pair of lower links pivoted on the tractor chassis, each link having a lift rod connected with a hitch actuator which is used to raise the lower link relative to the chassis, each lift rod being provided with a means for shortening its effective length in a stepwise manner so that the lower links can be raised to a higher position relative to the tractor chassis when the hitch actuator is used.

[0005] The tractor may have a towing hitch mounted on the chassis between the lower links, the lower links being raised clear of any drawbar coupled to the towing hitch when raised to their higher position.

[0006] Conveniently each lift rod may be in two parts whose level of overlapping can be changed thus varying the effective length of each lift rod in a stepwise manner, and locking means are provided to lock the two parts of the lift rod in a more overlapping configuration to reduce its effective length.

[0007] For example, one part of the lift rod may slide relative to the other part and a pivoting locking member on one part may engage behind an abutment on the other part to lock the two parts in the more overlapping configuration.

[0008] A convenient form of the above arrangement can be provided by having a piston like member on one part which slides within the other part of the lift rod and a spring loaded locking member which engages behind the piston like member to lock the two lift rod parts in the more overlapping configuration.

[0009] An alternative form of the present invention provides an arrangement in which the point of attachment of each lift rod relative to its respective lower link can be moved nearer the outer end of the lower link remote from

the link pivot thus allowing the hitch actuator to raise the lower links to a higher position when actuated.

[0010] For example, each lift rod may be normally attached to its respective lower link by a bolt and when the point of attachment is moved nearer the outer end of the lower link a coupling ball attached to the lift rod is gripped in an implement coupling hook provided on the outer end of the lower link.

[0011] The present invention will now be described, by way of example, with reference to the accompanying drawing in which:-

Figure 1 shows a side view of a rear portion of a tractor chassis showing fitted with an implement hitch in accordance with the present invention in its normal maximum height position;

Figure 2 shows the implement hitch of Figure 1 raised to a higher level using the arrangement of the present invention;

Figures 3 and 4 show part of the implement hitch of Figure 1 with a locking means in disengaged and engaged conditions respectively, and

Figures 5 to 8 shows side and plan views of an alternative arrangement of implement hitch in accordance with the present invention in normal maximum and higher maximum height positions.

[0012] Referring to the drawings, Figure 1 shows part of a three point hitch 10 mounted on the rear of a tractor chassis 11. The hitch has two lower links 12, only one of which is visible in Figure 1, which are pivotally mounted at 13 on the tractor chassis 11. Each lower link has at its outer end a coupling hook 14 which is provided with the conventional spring loaded latch 15.

[0013] As is normal each lower link 12 is raised and lowered relative to the chassis 11 by lift rods 15 which are connected with lift arms 16 which are in turn mounted on the chassis by a cross shaft 17. As is conventional, the lift arms 16 are rotated with cross shaft 17 by one or more hitch actuators 17a which act between the lift arms and the tractor chassis. The three point hitch 10 is completed by a so-called "top-link" (not shown) which is again pivotally mounted on the tractor chassis 11.

[0014] Figure 1 shows the lower links 12 in their normal maximum height position. A towing hitch 40 is mounted in a conventional manner on vertical rails 41 located between links 12. As can be seen from Figure 1, a trailer drawbar 42 connected with hitch 40 may interfere with the links 12 in the region 43 thus restricting the turning of the associated trailer.

[0015] In accordance with the present invention, the

effective length of each of the lift rods 15 can be shortened in a stepwise manner so that the lower links 12 can be raised to higher position, as shown in Figure 2, by the actuators 17a where the drawbar 42 no longer interferes with the lower links 12.

[0016] As best seen in Figures 3 and 4, the lower end of each lift rod 15 comprises a pair of plates 18 welded to a collar 19 through which the main body 15a of each lift rod is slideable in a bore 20. On the lower end of 15a of lift rod 15 is provided a piston-like member 21 which can move between end positions 21a and 21b shown in Figures 3 and 4 respectively. The plates 18 are secured to the associated lower link 12 by a bolt 22. Also mounted on the plates 18 is a locking device 23 which comprises an arm 24 pivoted on the plates 18 by a bolt 25.

[0017] The arm 24 is spring-loaded by a spring 26 so as to tend to rotate about the pivot bolt 25 in the direction of the arrow A of Figures 3 and 4.

[0018] When the piston like member 21 is in the position 21a the lift rods 18 have their normal operating length in which the piston like member 21 abuts the lower end of the collar 19 and the lower links 12 can be raised to the position shown in Figure 1.

[0019] To reduce the effective length of the lift rods 15 in a stepwise manner and thus to enable the lower links 12 to be raised to a higher position shown in Figure 2, the piston like member 21 is locked in position 21b by allowing the lever 24 to pivot to the Figure 4 position under the action of a spring 26 which surrounds the pivot pin 25. With the lever 24 in the Figure 4 position the end 24a of the lever 24 engages behind a shoulder 27 provided on the member 21 to hold the piston member in the 21b position thus shortening the effective length of the lift rods 15.

[0020] Typically with the member 21 in the 21a position the lower links can be raised to an angle X of 32 degrees above the horizontal and the lower edges of the links 12 are approximately 50mm below the upper surface of the drawbar 42 at the pivot axis Z of the drawbar (see distance D in Figure 1). By shortening the effective length of the lift rods 15 with the member 21 in the 21b position the lower links can be raised by an extra 13 degrees to an angle Y of 45 degrees above the horizontal and the vertical distance E of the lower edges of the links 12 is now approximately 60mm above the upper surface of the drawbar at the pivot axis Z. Thus the clearance of the lower edges of the links 12 has been increased by approximately 110mm on the pivot axis Z.

[0021] Figures 5 to 8 show an alternative arrangement in which the lower end of each lift rod 15 is provided with plates 30 which are normally secured to the lower link 12 through an aperture 31 using a bolt 32 as shown in Figures 5 and 6. A coupling ball 33 is permanently mounted on the inside plate 30 and when it is desired to shorten the effective length of the lift rods the bolt 32 is removed and the coupling ball 33 is gripped in the coupling hook 14 thus shortening the effective length of the lift rods and allowing the lower links 12 to be raised to a higher position

as shown in Figures 7 and 8.

Claims

1. A tractor having a chassis (11) with an implement hitch (10) comprising a pair of lower links (12) pivoted on the tractor chassis (11), each lower link (12) having a lift rod (15) connected with a hitch actuator (17a) which is used to raise the lower links (12) relative to the chassis (11), **characterised in that** each lift rod (15) is provided with a means for shortening its effective length (18,20) in a stepwise manner so that the lower links (12) can be raised to a higher position relative to the tractor chassis (11) when the hitch actuator (17a) is used.
2. A tractor according to claim 1 having a towing hitch (40) mounted on the chassis (11) between the lower links (12), the lower links (12) being raised clear of any drawbar (42) coupled to the towing hitch (40) when raised to the higher position
3. A tractor according to claim 1 or 2 in which each lift rod (15) is in two parts whose level of overlapping can be changed in a stepwise manner thus varying the effective length of each lift rod, and locking means (23) are provided to lock the two parts of the lift rod in a more overlapping configuration to reduce its effective length.
4. A tractor according to claim 3 in which one part of the lift rod (15) slides relative to the other part and a pivoting locking member (23) on one part may engage behind an abutment on the other part to lock the two parts in the more overlapping configuration.
5. A tractor according to claim 4 having a piston like member (21) on one part which slides within the other part of the lift rod (20) and a spring loaded locking member (24) which engages behind the piston like member (21) to lock the two lift rod parts in the more overlapping configuration.
6. A tractor according to claim 1 or 2 in which the point of attachment of each lift rod (15) relative to its respective lower link (12) can be moved nearer the outer end of the lower link (12) remote from the link pivot (13) thus allowing the hitch actuator to raise the lower links (12) to a higher position when actuated.
7. A tractor according to claim 6 in which each lift rod (15) is normally attached to its respective lower link (12) by a bolt (22) and when the point of attachment is moved nearer the outer end of the lower link (12) a coupling ball (33) attached to the lift rod (15) is gripped in an implement coupling hook (14) provided

on the outer end of the lower link (12).

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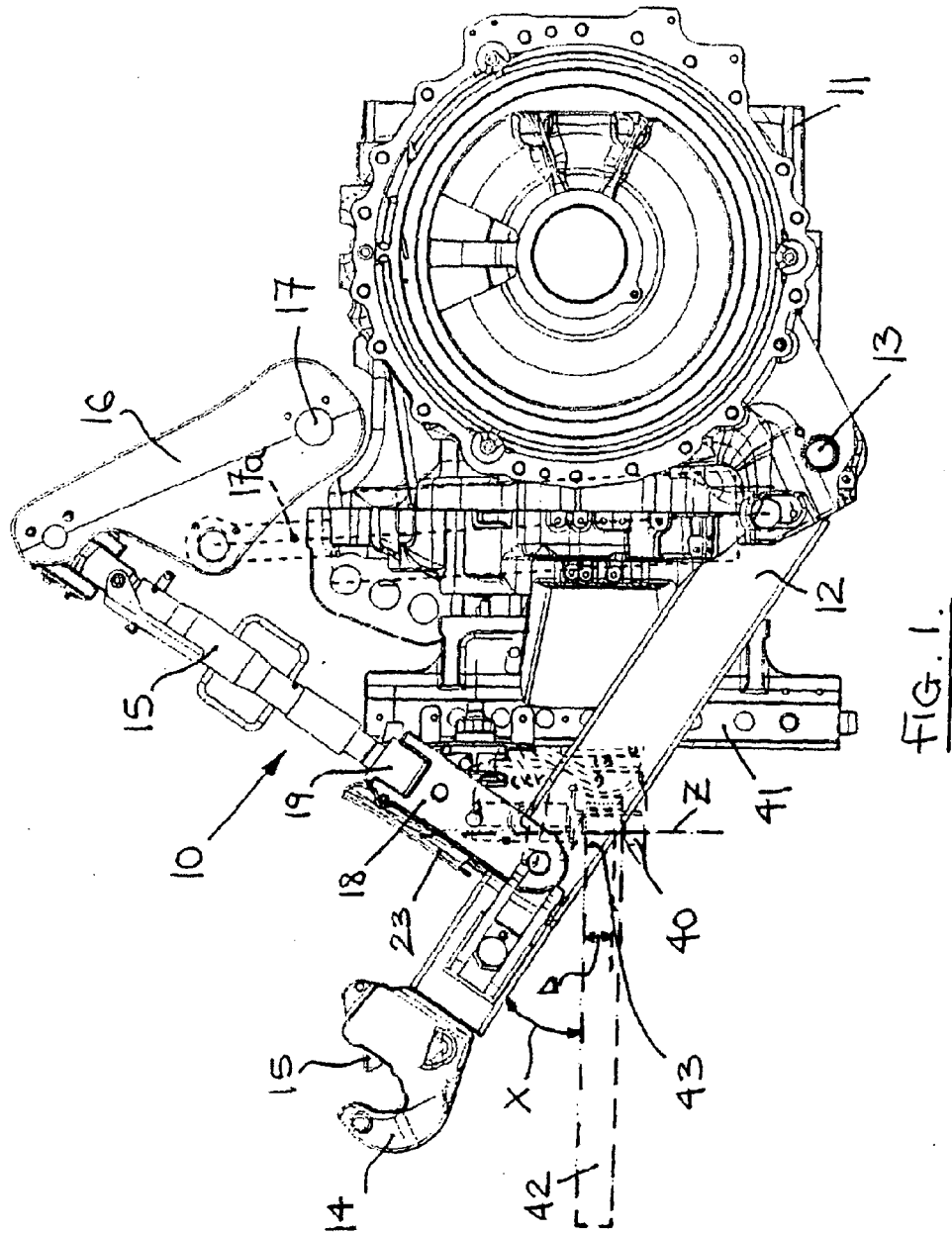
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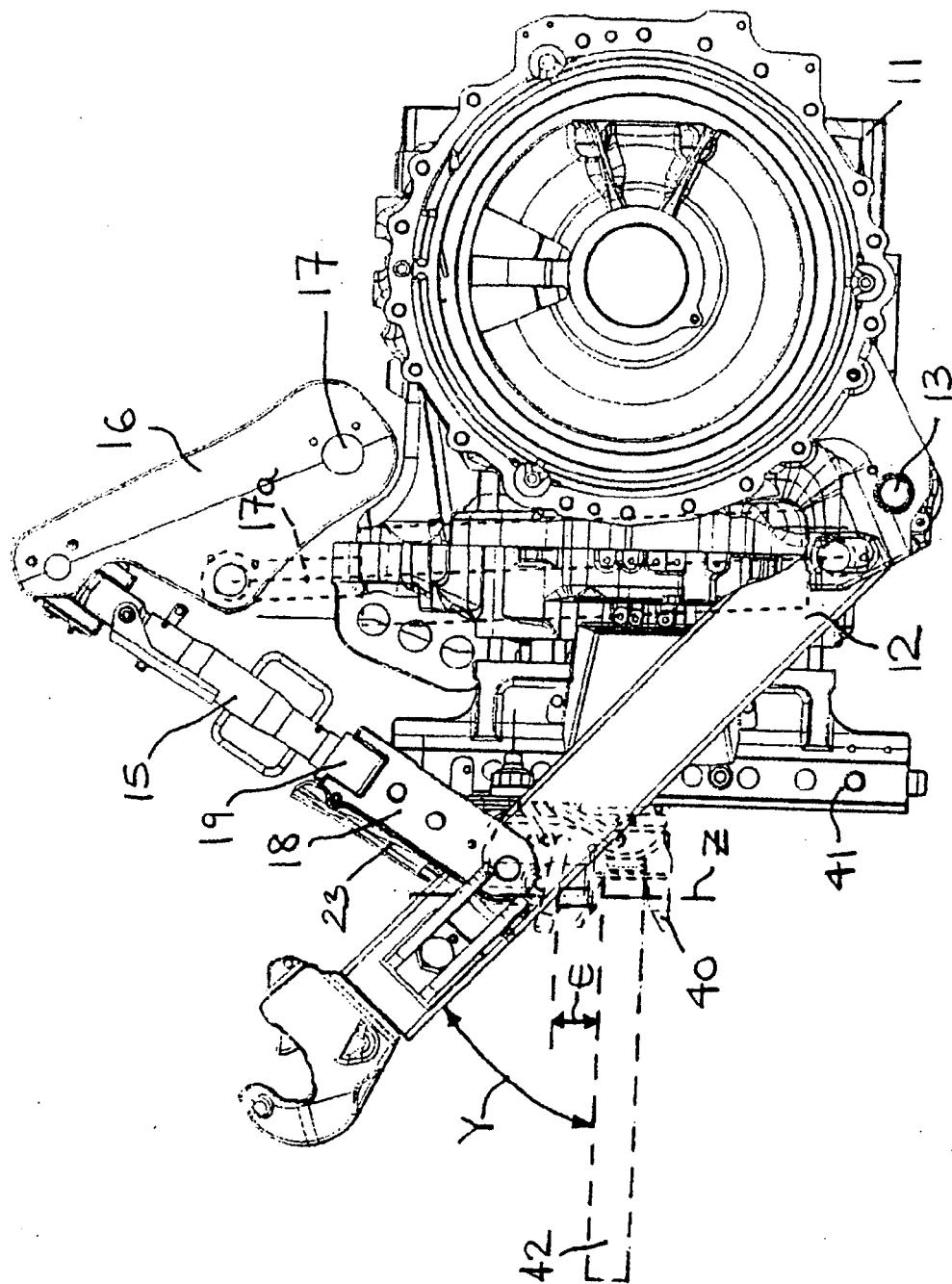
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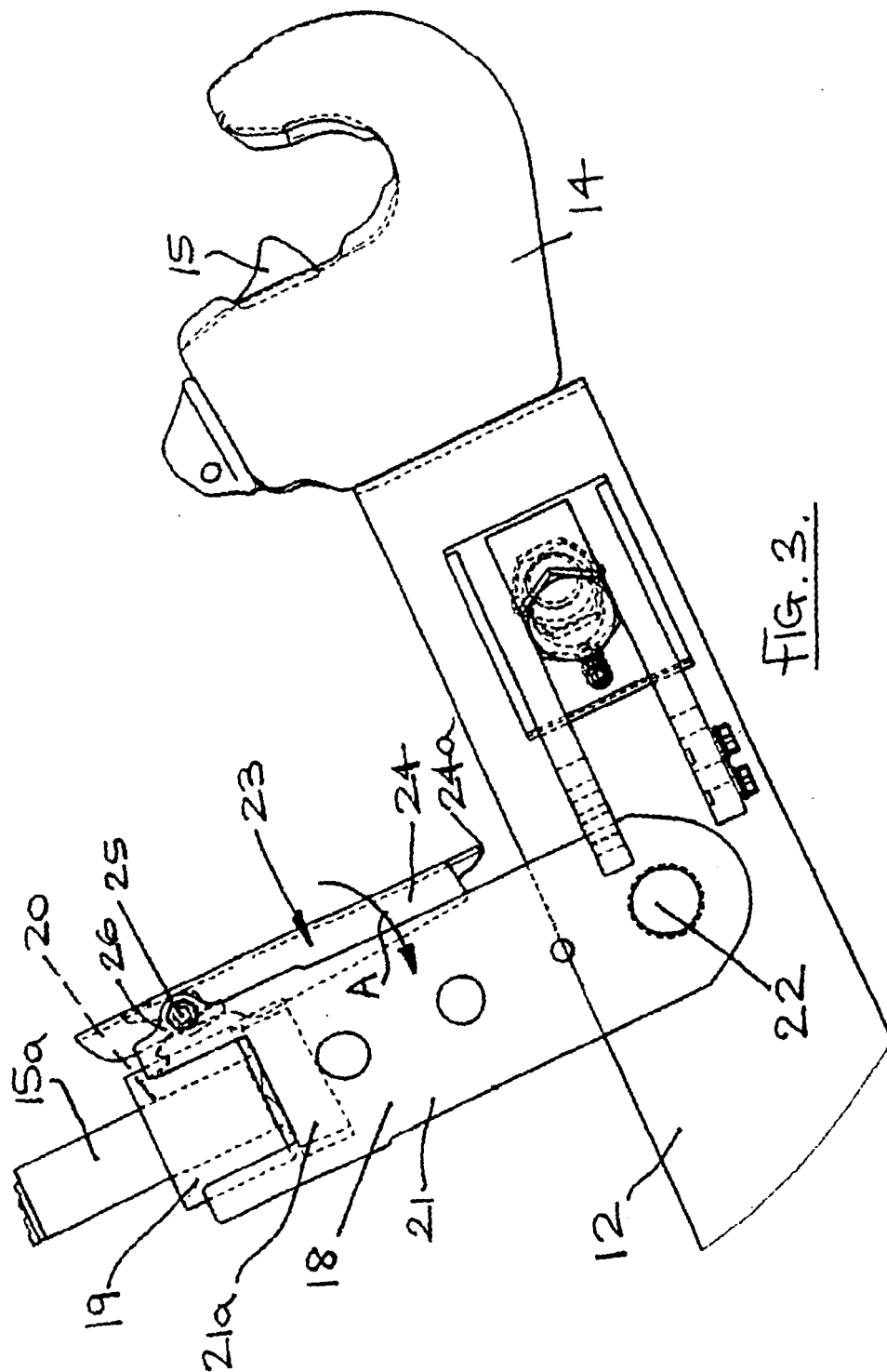
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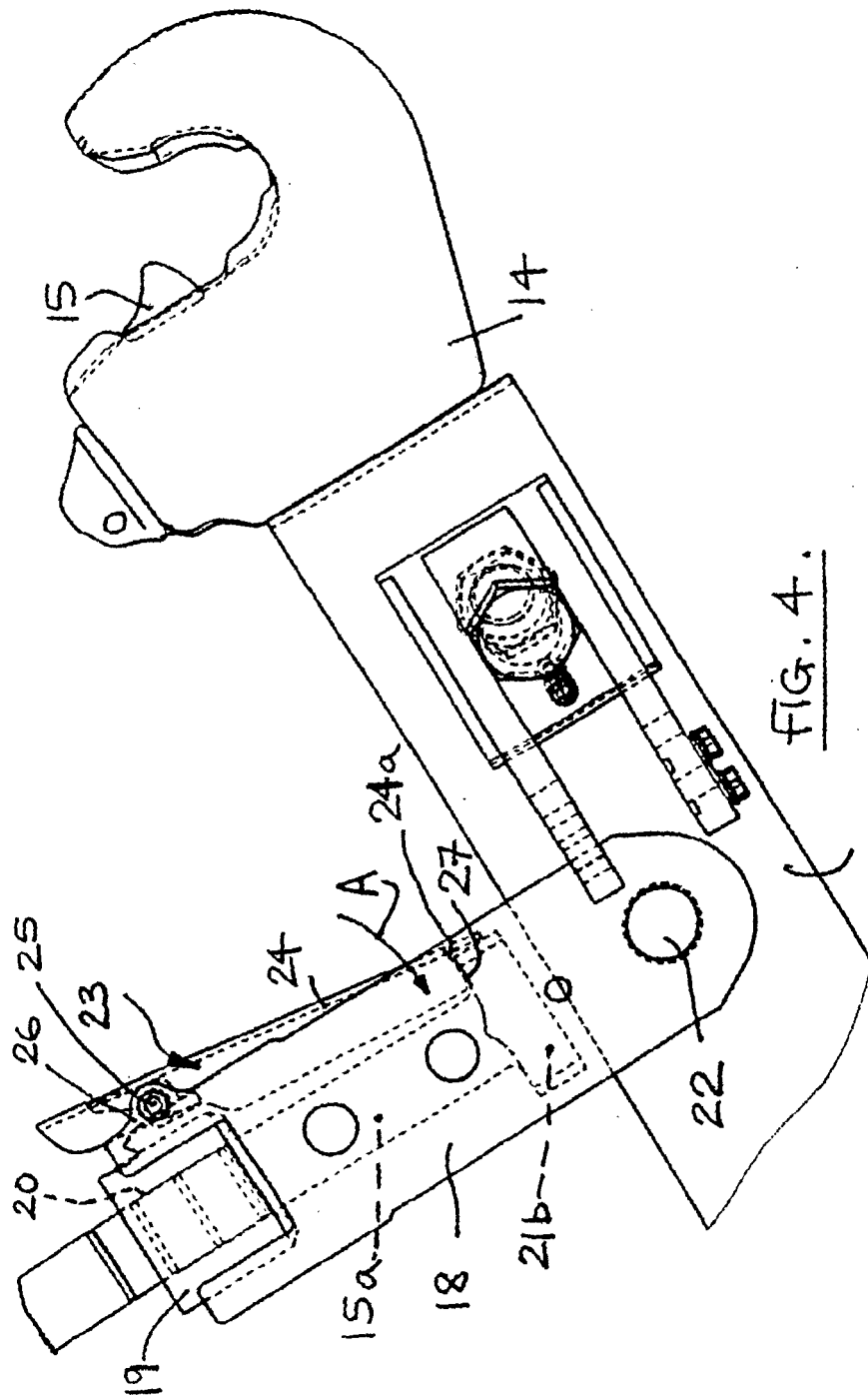
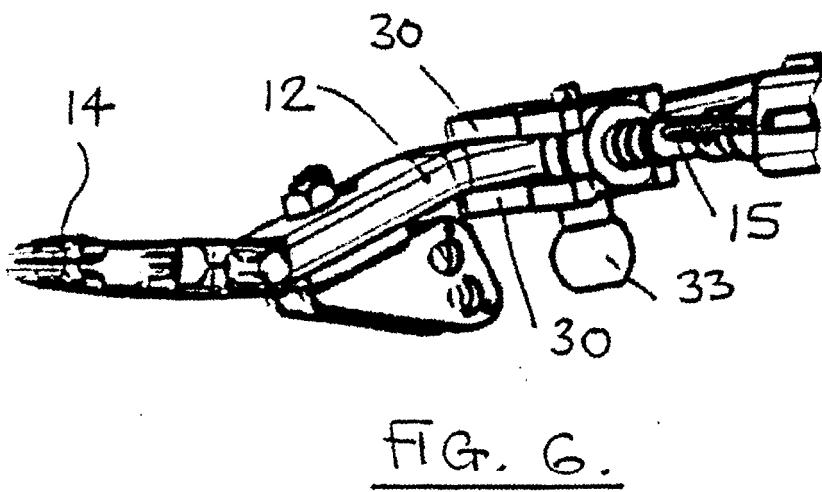
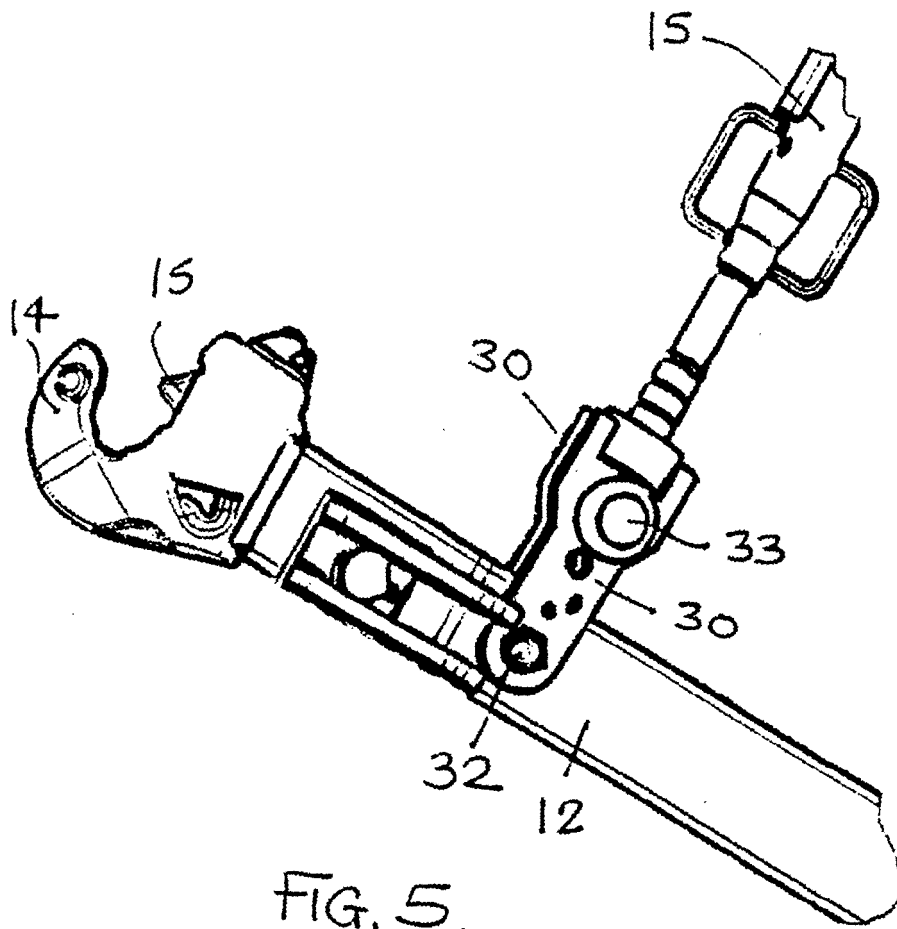
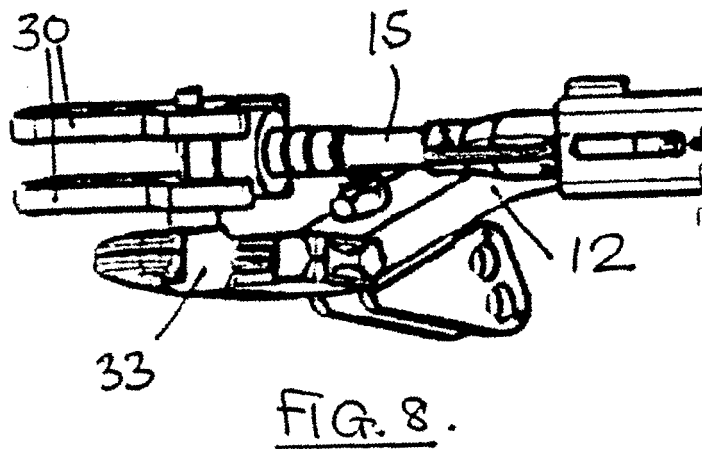
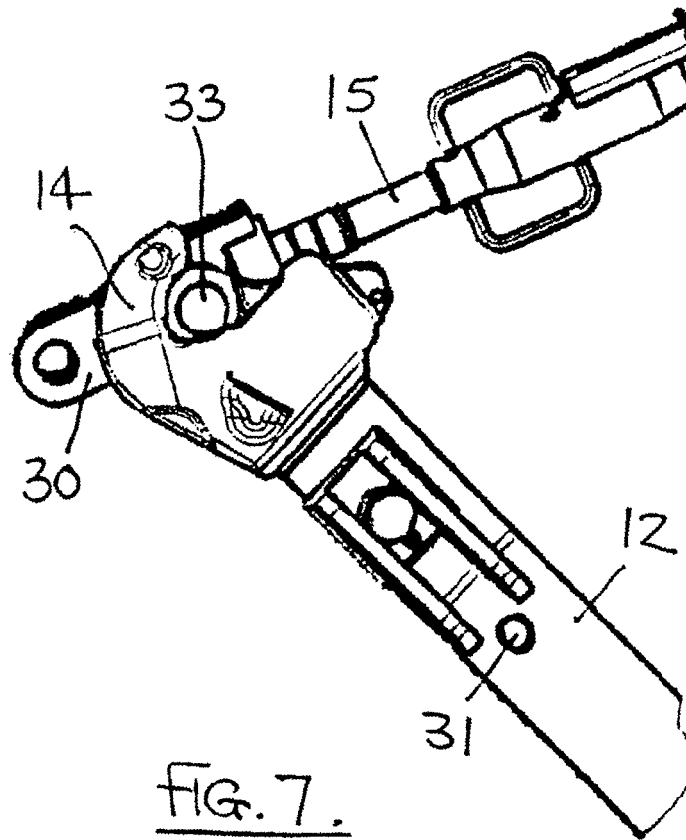


FIG. 4.







EUROPEAN SEARCH REPORT

Application Number
EP 09 00 6865

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	DE 10 2005 017578 A1 (DEERE & CO [US]) 26 October 2006 (2006-10-26) * paragraph [0035]; figure 1 *	1	TECHNICAL FIELDS SEARCHED (IPC) A01B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 September 2009	Examiner Bunn, David
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 00 6865

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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